



HIGH PERFORMANCE OPTICS FOR 1 MICRON FIBER LASERS

Wide selection of high quality optics

Protective windows

Spherical and aspherical lenses

Optical collimating & focusing assemblies

Customized zoom lenses for laser cutting heads

Wide range of optics for 1 micron high power fiber lasers

With decades of knowledge and experience in the optical industry, using cutting-edge measurement equipment, Ophir offers a wide array of first-class optics for high power fiber lasers in the 1 micron wavelength range, including:

- Protective windows
- Spheric & aspheric lenses
- Optical collimation and focusing assemblies (doublets and singlets)
- Motorized zoom lens for laser cutting head

High power lasers are a growing industry with numerous applications. As technology advances, and lasers become more sophisticated, the optics used in such systems must provide increasingly superior levels of performance. Here's where Ophir steps in. With the 1 micron high power laser optics range, Ophir guarantees maximum focus stability and minimum aberrations, by using advanced manufacturing technologies, for high optical performance.



Capabilities

- High LIDT (laser induced damage threshold) coatings 20J/ cm²
- Low absorption 10-50ppm
- High quality fused silica substrates

Typical coating features

AOI	0°-15°
%R	@1030-1090 < 0.1%-0.2%
%T	@650-670 > 60%-95% (2 sides)
%T @1030nm	T > 99.6%
%T @1064nm	T > 99.9%
%T @1070-1080nm	T > 99.6%
S/D	10-5

Mechanical properties

Elastic (Young's) modulus	73GPa
Poisson's ratio	0.16
Density	2.20g/cm ³
Knoop hardness (100g load)	522kg/mm ²

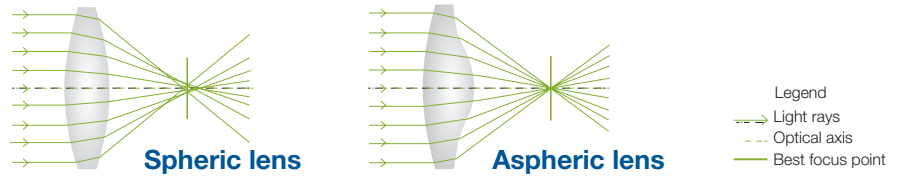
Thermal properties

Specific heat	0.770 J/(gK)
Thermal conductivity	1.38W/(mK)
Thermal diffusivity	0.0075 cm ² /s
Thermal expansion	9.6×10 ⁻⁶ K ⁻¹
Thermal coefficient	Δn/ΔT 9.6×10 ⁻⁶ K ⁻¹

Aspheric lenses

Aspheric surfaces on collimating and focusing lenses provide improved performance over conventional, spheric surfaces, in high-power industrial fiber laser and direct diode laser systems. The aspheric shape of the optics reduces spherical aberration, resulting in a smaller spot size, a uniform spot shape and greater depth of focus.

Ophir Fiberlens™ aspheric lenses are available in custom configurations for all high-power industrial fiber laser and direct diode laser systems.



Specification	Value / Range	Tolerance
Diameter (range)	12.0 – 300.0 mm	+ 0 / - 0.10 mm
Effective focal length (EFL)	20.0 – 500.0 mm	< 0.1%
Lens types	Aspherical – plano Aspherical – spherical Aspherical – aspherical	
Clear aperture	> 90% of diameter	
Asphere power	< 2.0 fringe at 632.8 nm Radius of curvature	
Asphere irregularity	< 0.5 fringe at 632.8 nm (P-V)	
Scratch - dig	20-10 or better	
Surface roughness	< 2 nm RMS	
Substrate material	High-purity, UV-grade fused silica	
Focal length	≤0.1%	
ETV	≤10µm	

Lenses for high power fiber lasers

Ophir P/N	Diameter (inch/mm)	F.L. (inch/mm)	E.T. (mm)
Focusing Doublet			
633859-117	1.18/ 30.0	4.92/ 125.00	Assembly #680339-001
633860-117	1.18/ 30.0	4.92/ 125.00	
633910-117	1.46/ 37.0	5.91/ 150.00	Assembly #680337-001
633911-117	1.46/ 37.0	5.91/ 150.00	
633771-117	1.18/ 30.0	5.91/ 150.00	
633772-117	1.18/ 30.0	5.91/ 150.00	
Collimating Doublet			
633861-117	1.18/ 30.0	3.94/ 100.00	Assembly #680340-001
633862-117	1.18/ 30.0	3.94/ 100.00	
634132-117	1.46/ 37.0	3.94/ 100.00	Assembly #680355-001
634133-117	1.46/ 37.0	3.94/ 100.00	
Single Lens			
632284-117	1.50/ 38.1	7.50/ 190.50	7.00
631669-117	1.50/ 38.1	5.00/ 127.00	7.00
632291-117	1.50/ 38.1	7.09/ 180.00	3.00
632292-117	1.50/ 38.1	8.66/ 220.0	3.30
632294-117	2.00/ 50.8	5.91/ 150.00	11.60
633112-117	2.00/ 50.8	7.50/ 190.00	11.45
632331-117	1.18/ 30.0	7.87/ 200.00	2.45
632754-117	1.00/ 25.4	8.00/ ~200.00	6.00
633842-117	1.00/ 25.4	4.43/ 112.5	2.40
633214-117	1.00/ 25.4	3.94/ 100.00	2.00
631521-117	1.38/ 35.0	5.91/ 150.00	9.00
633841-117	1.00/ 25.4	8.86/ 229.00	3.20
633415-117	1.50/ 38.1	8.27/ 210.00	6.38
633120-117	1.97/ 50.0	8.66/ 220.00	2.80
633230-117	1.57/ 40.0	5.91/ 150.00	5.00

Protective windows for high power fiber lasers

Ophir P/N	Diameter (inch/mm)	E.T. (mm)
633267-117	0.85/ 21.5	2.00
632252-117	0.88/ 22.4	4.00
632445-117	1/ 25.4	3.00
633723-117	1/ 25.4	5.00
633481-117	1/ 25.4	4.00
632830-117	1.18/ 30.0	5.00
632240-117	1.18/ 30.0	1.50
632755-117	1.26/ 32.0	6.35
632595-117*	1.31/ 33.3	1.50
632251-117	1.34/ 34.0	5.00
632851-117	1.42/ 36.0	5.00
633411-117	1.46/ 37.0	7.00
632958-117	1.5/ 38.1	5.00
633347-117	1.5/ 38.1	1.50
632933-117	1.65/ 42.0	9.00
632498-117	1.97/ 50.0	2.00
634376-117	1.97/ 50.0	8.0
632346-117	2/ 50.8	6.35
632713-117	2.17/ 55.0	1.50
633824-117	1.38/ 35.0	1.50

*Octagonal window

Optical collimating and focusing assemblies

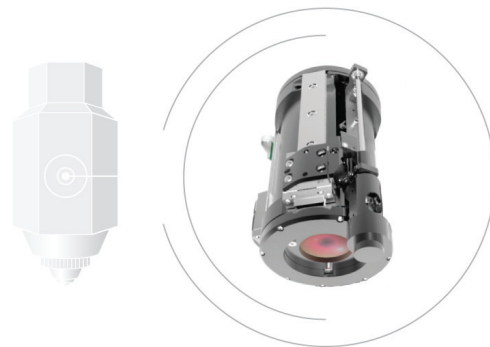
Our line of replacement focusing and collimation assemblies is available off-the-shelf and is compatible with leading OEM laser brands. Standard products are offered for 100mm, 125mm, 150mm, 200mm focal lengths. Custom design and manufacture, in accordance with customer needs, is available upon request.



Customized motorized zoom lenses for laser cutting heads

Typical features

- Magnification range X1-X4
- Continuous zoom
- Total transmission >97%
- Focus range -15mm to +20mm
- Focus time 0.5sec for full range
- OEM custom designs are available upon request



About Ophir Laser Optics

With vast knowledge and extensive experience accumulated over four decades, Ophir Laser Optics Group, an MKS (NASDAQ: MKSI) company, offers a full range of high quality OEM and replacement optics for high power CO₂ and 1 μ m laser applications, in the 10.6 μ m, 9.3 μ m and 1 μ m wavelength ranges. Used by leading laser manufacturers around the world, our products meet the highest industry standards and have been widely tested with outstanding results. All manufacturing is carried out in-house using automated CNC, patented diamond turning technologies, and advanced, cutting-edge coating processes and measuring equipment. With a global distribution and support network, our commitment to our customers is unparalleled.

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